

Compact, Controlled Force Crew Exercise System, Phase II

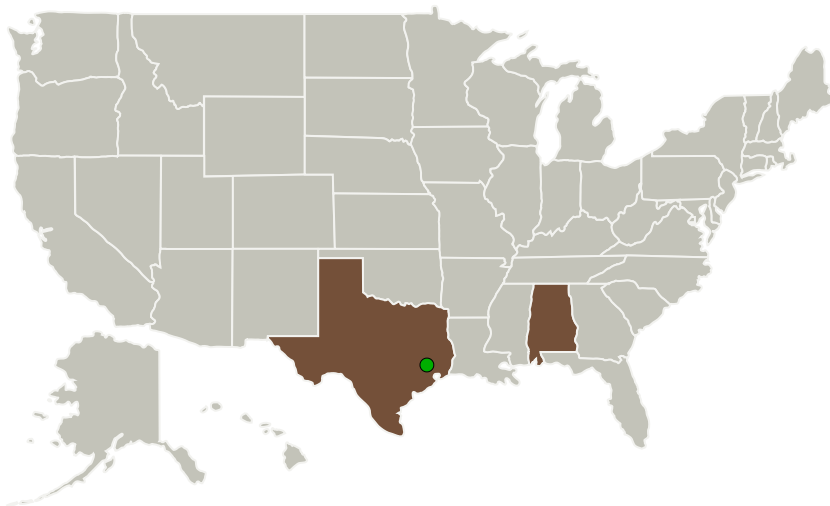
Completed Technology Project (2010 - 2012)



Project Introduction

Spaceflight adaptations include muscle atrophy, decreased bone mineral density and reduced aerobic capacity making effective resistance exercise countermeasure hardware necessary for safe and successful space exploration. Real-time control is applied to an electric servo-motor to provide resistance in a lightweight, compact, and reconfigurable design. The key real-time force control with the ability to accurately simulate a freeweight lift was successfully demonstrated during Phase 1. A cycle ergometer will be integrated into the system to provide aerobic exercise and power generation. The technical objectives for Phase 2 include the development of a compact flight configuration prototype that supports a variety of exercise modes. The loads are adjustable in 2.5 kg increments to maintain muscle strength and bone density. Limited human subject testing will demonstrate functionality spanning entire anthropometric range.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Streamline Automation, LLC	Lead Organization	Industry	Huntsville, Alabama
● Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas



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Primary U.S. Work Locations

Alabama

Texas

Project Transitions

 **February 2010:** Project Start

 **February 2012:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138895>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Streamline Automation, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

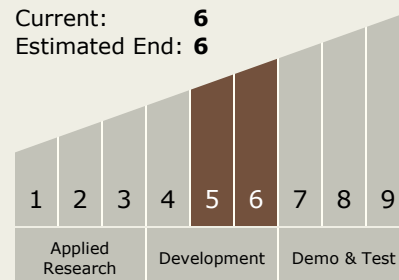
Carlos Torrez

Principal Investigator:

Stelu Deaconu

Technology Maturity (TRL)

Start: 5
Current: 6
Estimated End: 6



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - └ TX06.3 Human Health and Performance
 - └ TX06.3.2 Prevention and Countermeasures

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System